procedure involves generating two calibration curves, $F_1$ versus pitch angle and $F_2$ versus pitch angle. To generate these two curves, $F_1$ and $F_2$ shall be derived using Equations 2F–1 and 2F–2, below. Table 2F–8 provides an example wind tunnel calibration data sheet, used to log the measurements needed to derive these two calibration curves.

10.6.1 Calibration velocities. The tester may calibrate the probe at two nominal wind tunnel velocity settings of 18.3 m/sec and 27.4 m/sec (60 ft/sec and 90 ft/sec) and average the results of these calibrations, as described in section 10.6.16.1, in order to generate a set of calibration curves. If this option is selected, this single set of calibration curves may be used for all field applications over the entire velocity range allowed by the method. Alternatively, the tester may customize the probe calibration for a particular field test application (or for a series of applications), based on the expected average velocity(ies) at the test site(s). If this option is selected, generate each set of calibration curves by calibrating the probe at two nominal wind tunnel velocity settings, at least one of which is greater than or equal to the expected average velocity(ies) for the field application(s), and average the results as described in section 10.6.16.1. Whichever calibration option is selected, the probe calibration coefficients ($F_2$ values) obtained at the two nominal calibration velocities shall, for the same pitch angle setting, meet the conditions specified in section 10.6.16.

10.6.2 Pitch angle calibration curve ($F_1$ versus pitch angle). The pitch angle calibration involves generating a calibration curve of calculated $F_1$ values versus tested pitch angles, where $F_1$ is the ratio of the pitch pressure to the velocity pressure, i.e.,

$$F_1 = \frac{(P_4 - P_5)}{(P_1 - P_2)} \qquad \text{Eq. 2F-1}$$

See Figure 2F–14 for an example $F_1$ versus pitch angle calibration curve.

10.6.3 Velocity calibration curve ($F_2$ versus pitch angle). The velocity calibration involves generating a calibration curve of the 3–D probe's $F_2$ coefficient against the tested pitch angles, where

$$F_2 = C_p \sqrt{\frac{\Delta P_{std}}{(P_1 - P_2)}} \qquad \text{Eq. 2F-2}$$

and

$C_p$ = calibration pitot tube coefficient, and
$\Delta P_{std}$ = velocity pressure from the calibration pitot tube.

See Figure 2F–15 for an example $F_2$ versus pitch angle calibration curve.

10.6.4 Connect the tested probe and calibration pitot probe to their respective pressure-measuring devices. Zero the pressure-measuring devices. Inspect and leak-check all pitot lines; repair or replace, if necessary. Turn on the fan, and allow the wind tunnel air flow to stabilize at the first of the two selected nominal velocity settings.

10.6.5 Position the calibration pitot tube at its measurement location (determined as outlined in section 6.11.4.3), and align the tube so that its tip is pointed directly into the flow. Ensure that the entry port surrounding the tube is properly sealed. The calibration pitot tube may either remain in the wind tunnel throughout the calibration, or be removed from the wind tunnel while measurements are taken with the probe being calibrated.

10.6.6 Set up the pitch protractor plate on the tested probe's entry port to establish the pitch angle positions of the probe to within ±2°.

10.6.7 Check the zero setting of each pressure-measuring device.

10.6.8 Insert the tested probe into the wind tunnel and align it so that its $P_1$ pressure port is pointed directly into the flow and is positioned within the calibration location (as defined in section 3.20). Secure the probe at the 0° pitch angle position. Ensure that the entry port surrounding the probe is properly sealed.

10.6.9 Read the differential pressure from the calibration pitot tube ($\Delta P_{std}$), and record its value. Read the barometric pressure to within ±2.5 mm Hg (±0.1 in. Hg) and the temperature in the wind tunnel to within 0.6°C (1°F). Record these values on a data form similar to Table 2F–8.

10.6.10 After the tested probe's differential pressure gauges have had sufficient time to stabilize, yaw null the probe, then obtain differential pressure readings for ($P_1$–$P_2$) and ($P_4$–$P_5$). Record the yaw angle and differential pressure readings. After taking these readings, ensure that the tested probe has remained at the yaw-null position.

10.6.11 Either take paired differential pressure measurements with both the calibration pitot tube and tested probe (according to sections 10.6.9 and 10.6.10) or take readings only with the tested probe (according to section 10.6.10) in 5° increments over the pitch-angle range for which the probe is to be calibrated. The calibration pitch-angle range shall be symmetric around 0° and shall exceed the largest pitch angle expected in the field by 5°. At a minimum, probes shall be calibrated over the range of −15° to +15°. If paired calibration pitot tube and tested probe measurements are not taken at each pitch angle setting, the differential pressure from the calibration pitot tube shall be read, at a minimum, before taking the tested probe's differential pressure reading at the first pitch angle setting and after taking the